

REMARKS

Claims 1-35 are pending. By this Amendment, the Abstract is amended, claims 30-35 are added and claims 13 and 14 are amended. No new matter is added by the above amendments.

Claims 13 and 14 are amended for clarity only, not to distinguish over the applied reference. The amendments do not narrow claims 13 and 14.

I. Information Disclosure Statement

The Examiner is requested to consider the references submitted with the attached Information Disclosure Statement.

II. Amended Abstract

The Office Action objected to the Abstract because it was longer than 150 words. The attached amended Abstract shortens the Abstract below 150 words. Withdrawal of the objection is requested.

III. All Pending Claims are Patentable

Claims 1-3, 6-9, 12, 13, 15 and 24-29 stand rejected under 35 U.S.C. §102(e) over U.S. Patent No. 5,997,963 to Davison et al. This rejection is respectfully traversed.

Davison et al. discloses an arrangement in which a gas bearing 15 is provided between a reference member 2 and a wafer stage 3. The gas bearing surrounds the substrate to form a "sealed" chamber around the substrate between the projection optical system and the wafer stage. See col. 1, line 66 - col. line 20, and col. 6, lines 25-29 of Davison et al.

In addition, the Davison et al. reference member 2 includes an inlet 7 and an outlet 10 through which a pressurized, inert gas is supplied and discharged. See col. 2, lines 21-42, col. 5, lines 23-24, and col. 5, lines 45-53. Davison et al. teaches that the pressure of the inert gas should be regulated so as to remain above ambient pressure. See, for example, col. 4, lines 5-11, col. 5, lines 24-40, and col. 10, lines 8-14. The reference member 2 includes a window 5 located in an aperture 6, and through which the exposure beam is directed. See, for

example, col. 2, lines 43-45, and col. 5, lines 14-22. No gas is transmitted through the window 5 or the aperture 6.

With respect to independent claim 1, Davison et al. does not disclose or suggest "supplying a gas through which the exposure light beam is transmitted, from a tip or interior of the projection optical system toward an exposure area on the second object" as recited in claim 1. Accordingly, independent claim 1 and its dependent claims are patentable over Davison et al.

With respect to independent claim 6, Davison et al. does not disclose or suggest "a gas supply unit which supplies a gas through which the exposure light beam is transmitted, through the aperture of the guide member toward the second object" as recited in claim 6. While reference member 2 includes an aperture 6, that aperture 6 is entirely sealed by window 5. Accordingly, independent claim 6 and its dependent claims are patentable over Davison et al.

With respect to independent claim 13, Davison et al. teaches that a mask 35, arranged between the lithography projection unit 34 and the reference member 2 as shown in Fig. 1, can be omitted. See col. 10, lines 14-23. However, Davison et al. does not disclose or suggest "providing a guide member having an aperture for allowing the exposure light beam having passed through the projection optical system to pass therethrough, at an end of the projection optical system on a side of the second object" as recited in claim 13. In addition, as mentioned above with respect to claim 6, Davison et al. does not disclose or suggest "providing a gas supply unit which supplies a gas through which the exposure light beam is transmitted, the gas supply unit supplying the gas toward the second object through the aperture of the guide member." Accordingly, independent claim 13 is patentable over Davison et al.

With respect to independent claim 24, although Davison et al. shows in Fig. 1 that a gas is supplied toward a wafer substrate 14, Davison et al. does not disclose or suggest

"supplying a gas through which the exposure light beam is transmitted, toward an optical path for the exposure light beam on a side of a tip of the projection optical system in a space between the second object and the tip of the projection optical system" as recited in claim 24.

In addition, as discussed with respect to claim 1, Davison et al. also does not disclose or suggest a "gas which has flown from the tip of the projection optical system toward the second object" as recited in claim 24. Davison et al. also does not disclose or suggest aspirating the gas from the optical path for the exposure light beam as recited in claim 24.

Accordingly, independent claim 24 and its dependent claims are patentable over Davison et al.

With respect to independent claim 27, as discussed above with respect to claim 24, Davison et al. does not disclose or suggest "a gas supply unit which is arranged on a side of a tip of the projection optical system between the second object and the tip of the projection optical system and which supplies a gas through which the exposure light beam is transmitted, toward an optical path for the exposure light beam" as recited in claim 27. In addition, Davison et al. also does not disclose or suggest "the gas which has flown from the tip of the projection optical system toward the second object" or "a gas-aspirating unit" which aspirates the gas from the optical path for the exposure light beam as recited in claim 27.

Accordingly, independent claim 27 and its dependent claims are patentable over Davison et al.

Withdrawal of the 35 U.S.C. §102(e) rejection based upon Davison et al. is requested.

Newly added claims 30-35 are patentable over Davison et al. at least because Davison et al. does not disclose or suggest "supplying a gas through which the exposure light beam is transmitted, from a circumference of a tip of the projection optical system toward an optical path for the exposure light beam in a space between the second object and the tip of the projection optical system," and "aspirating a part of the gas which has flown toward the

second object from the circumference of the tip of the projection optical system" as recited in independent claims 30 and 33.

Claims 4, 5, 10, 11, 14 and 16-23 stand rejected under 35 U.S.C. §103(a) over Davison et al. This rejection is respectfully traversed.

As recognized in the Office Action, Davison et al. does not disclose controlling a state of flow of the gas depending on a position of the stage that positions the second object, as recited in independent claims 4, 10 and 14. Although the Office Action asserts that it would have been obvious to one having ordinary skill in the art to modify Davison et al. to have such a feature, there is no evidence in the record that there would have been motivation or suggestion to make such a modification to Davison et al. Davison et al. only teaches that the pressure should be regulated so that it remains above ambient. Davison et al. does not disclose or suggest that the state of flow of the gas should be controlled depending on a position of the stage. Accordingly, the Office Action has failed to make a *prima facie* case of obviousness.

With respect to claims 4, 10 and 14, one effect that can be obtained due to the feature of "controlling a state of flow of the gas depending on a position of a stage which positions the second object" is described, for example, on page 7, line 20 - page 8, line 13, and with respect to the third embodiment described on page 44, line 9 - page 50, line 13. When the position of the stage is measured, for example, with an interferometer, a measuring light beam is radiated onto the stage. In this situation, for example, the flow of the gas through which the exposure light beam is transmitted is controlled so that the fluctuation of the light beam is suppressed on the optical path when the optical path for the light beam of the interferometer approaches the projection optical system. Accordingly, it is possible to avoid a decrease in positioning accuracy of the stage.

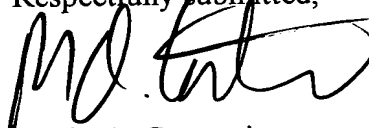
Withdrawal of the rejection under 35 U.S.C. §103(a) based upon Davison et al. is requested.

IV. Conclusion

In view of the foregoing, Applicants respectfully submit that this application is in condition for allowance. Favorable reconsideration and prompt allowance are earnestly solicited.

Should the Examiner believe that anything further would be desirable to place this application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,



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MAC/ccs

Attachments:

Amended Abstract
Information Disclosure Statement
Petition for Extension of Time
Amendment Transmittal

Date: May 12, 2004

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ABSTRACT

An exposure method and an exposure apparatus make it possible to easily supply a gas through which an exposure light beam is transmitted, to a space between a projection optical system and a substrate ~~as an exposure objective~~. A wafer (W) is exposed with a ~~reduced~~ an image of a pattern on a reticle (R) by radiating the exposure light beam (IL) having passed through the pattern on the reticle (R), onto the wafer (W) via a projection optical system (PL) ~~composed of a cata-dioptric system~~. A purge guide plate (33), which has a guide hole (33a) ~~formed in the vicinity of the field center~~, is installed between the wafer (W) and an optical member (M2) disposed at the tip of the projection optical system (PL). A purge gas, through which the exposure light beam (IL) is transmitted, is supplied ~~from a gas supply unit (26)~~ to the space between the ~~purge guide plate (33)~~ wafer and the optical member (M2) ~~disposed at the tip~~. The purge gas flows ~~in a form of downflow~~ through the guide hole (33a) toward the wafer (W), and then the ~~purge gas~~ flows in directions toward the outer circumference.